

## SUBSTITUTE ABSTRACT

An apparatus for hyperpolarizing atomic nuclei through optical pumping has a cylindrical optical pumping cell having an inlet and an outlet spaced therefrom. A supply of a mixture of optically pumpable species and hyperpolarizable nuclei is connected to the inlet of the cell. A nozzle at an inlet of the optical pumping cell forms and injects a jet flow of the mixture into the optical pumping cell. It is then drawn out through the outlet such that the mixture touches the inner walls of the optical pumping cell only adjacent the outlet.